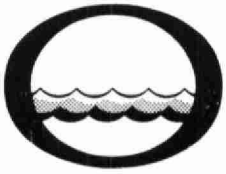
1970 OPERATING SUMMARY

GALT water pollution control plant

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations



Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.

D. S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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GALT

water pollution control plant

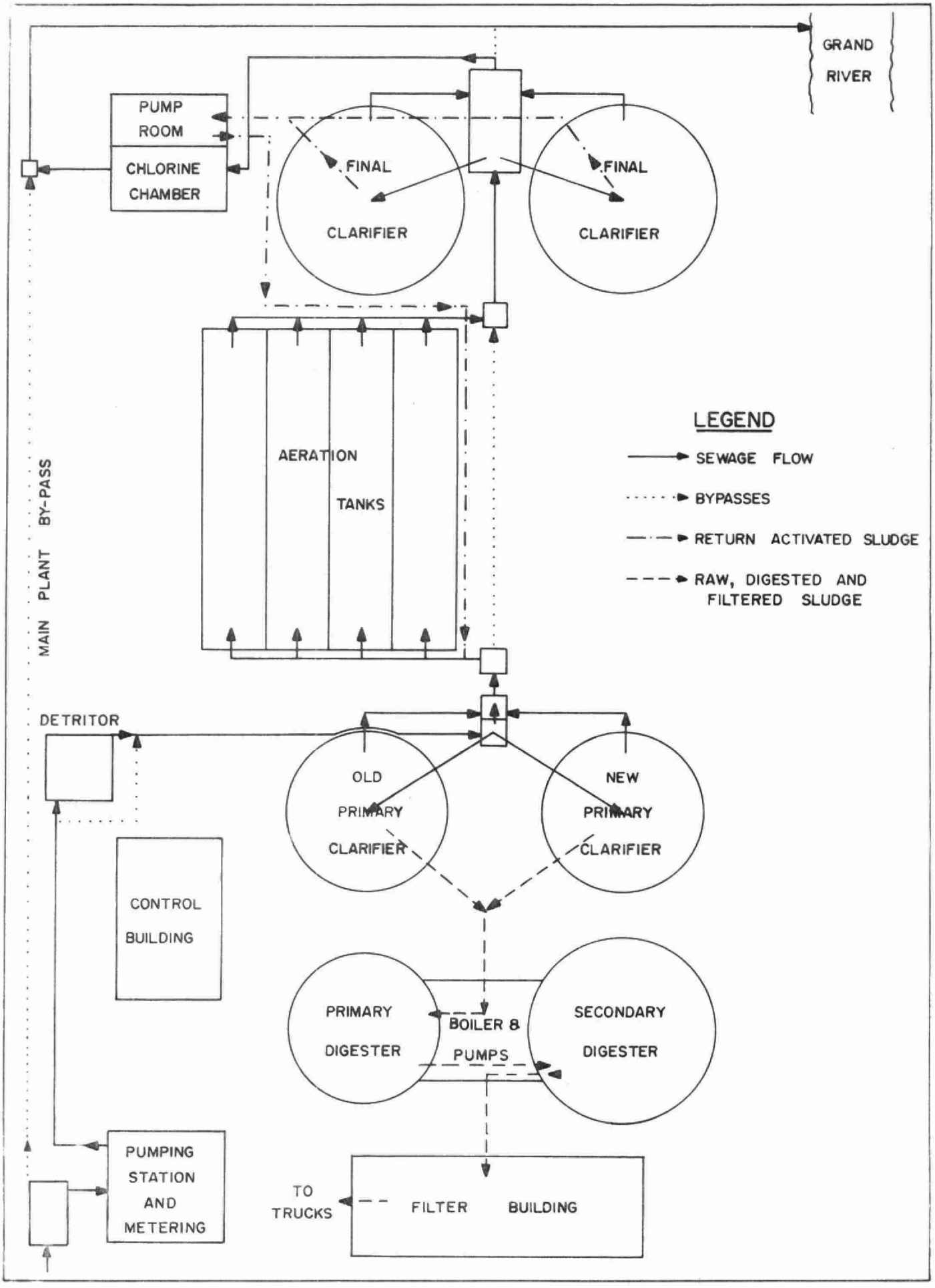
operated for

THE CITY OF GALT

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY


GRAND RIVER
PUMP ROOM
CHLORINE CHAMBER
FINAL CLARIFIER
FINAL CLARIFIER
AERATION TANKS
MAIN PLANT BY-PASS
LEGEND
SEWAGE FLOW
BYPASSES
RETURN ACTIVATED SLUDGE
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DETRITOR
OLD PRIMARY CLARIFIER
NEW PRIMARY CLARIFIER
CONTROL BUILDING
PRIMARY DIGESTER
BOILER & PUMPS
SECONDARY DIGESTER
PUMPING STATION AND METERING
TO TRUCKS
FILTER BUILDING

DESIGN DATA

PROJECT NO.	2-0090-61	TREATMENT	Activated Sludge
DESIGN FLOW	5.0 mgd	DESIGN POPULATION	34,000
BOD - Raw Sewage	250 mg/l	SS - Raw Sewage	250 mg/l
- Removal	90%	- Removal	90%

PRIMARY TREATMENT

Comminution

Type: C.P. Barminutor
Size: One Model C (36")

Raw Sewage Pumps

Type: Babcock-Wilcox
Size: Three 3500 gpm @ 30' tdh

Grit Removal

Type: Eimco Detritor
Size: One 18' x 18' x 2' deep
(4,000 gal)
Retention: 1.15 min

Primary Sedimentation

Type: (a) Dorr (old cl.)
(b) Eimco (new cl.)
Size: Two 60' dia x 9' swd
50,600 cu ft or 315,000 gal)
Retention: 1.5 hours
Loading: Surface, 884 gal/ft^2/day
Weir, 13,250 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration
Single pass (5-cell)
Size: Four 150' x 30' x 13.7'
(234,000 cu ft or 1.46 mil gal)
Retention: 7.0 hours

Aerators

- Twenty Ames-Crosta

Secondary Sedimentation

Type: Eimco
Size: Two 75' dia x 10' swd
(88,400 cu ft or 550,000 gal)
Retention: 2.64 hours
Loading: Surface, 566 gal/ft^2/day
Weir, 10,600 gal/ft/day

CHLORINATION

- One F & P Automatic

Chlorine Contact Chamber

Size: One 49.25' x 21.5' x 7.25'
(46,000 gal)
Retention: 13.25 min

OUTFALL

- to Grand River

SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --
Type: Eimco draft tube mixers (2) on concrete roof
Size: One 50' dia x 20' swd (30,300 cu ft or 189,000 gal)

Secondary --
Size: One 70' dia x 20' swd (77,000 cu ft or 480,000 gal)

Vacuum Filter

Type: Eimco (cloth)
Size: One, 380 sq ft

'70 REVIEW

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	5.16	—	1881.6	—
High	5.84	March	181.2	March
Low	4.73	July	146.2	July

GENERAL

The Galt Water Pollution Control Plant is a conventional activated sludge project with a design flow of 5.0 million gallons per day. Sewage entering the plant receives primary clarification, secondary biological treatment and the final effluent is disinfected by chlorine prior to being discharged to the Grand River. Sludge removed from the sewage is stabilized by digestion prior to disposal on farm lands.

The plant is staffed by seven men which include one superintendent, one laboratory technician, one maintenance technician and four operators.

Under the supervision of head office engineers, the plant staff operated a clean, attractive and efficient plant for the City of Galt.

EXPENDITURES

In 1970, a total of 1881.6 million gallons was treated at an operating cost of $104,956.90. Cost per million gallons treated was $55.78 and the cost per pound of BOD removed was four cents.

PLANT FLOWS and CHLORINATION

The average daily flow was 5.16 million gallons, 14% less than the 1969 flow of 6.0 mgd. The average daily flow was 3% greater than the design flow of 5.0 million gallons per day. The design flow was exceeded 57% of the time during the year.

An average chlorine dosage of 3.0 mg/l was required to maintain a chlorine residual of 0.5 mg/l in the final effluent.

PLANT EFFICIENCY

The average BOD of the raw sewage and final effluent were 151 mg/l and 12 mg/l respectively. The plant removed an average of 92% of the BOD compared to 89% in 1969. The OWRC effluent BOD objective of 15 mg/l was exceeded 30% of the time.

The suspended solids in the raw sewage and final effluent averaged 158 mg/l and 21 mg/l respectively. The plant removed an average of 87% of the suspended solids compared to 88% in 1969. The OWRC final effluent suspended solids objective of 15 mg/l was exceeded 72% of the time.

SLUDGE DIGESTION and DISPOSAL

A total of 3.85 million gallons of sludge was pumped to the digester system during the year. The raw sludge averaged 5.8% total solids, of which 78% was volatile matter.

Digested sludge from the secondary digesters averaged 4.0% total solids, of which 65% was volatile matter. The average reduction in volatile matter was 48%.

Both digesters were emptied and cleaned during the year. Cleaning of the primary digester was necessary because of the abnormally large quantities of rags that are received at the plant which are eventually pumped to the primary digester. The rags tend to conglomerate in the primary digester and block the internal piping. The primary digester was last emptied and cleaned in November, 1967.

CONCLUSIONS and RECOMMENDATIONS

The plant is hydraulically overloaded. Despite this, it produced an acceptable effluent most of the time. High flows are received at the plant during storm periods. The lower than normal raw sewage BOD suggests that infiltration in the sewer system is a problem.

It is recommended that every step possible be taken to reduce infiltration in the sewer system.

It is also recommended that the City of Galt reduce the volume of rags reaching the plant as much as possible.

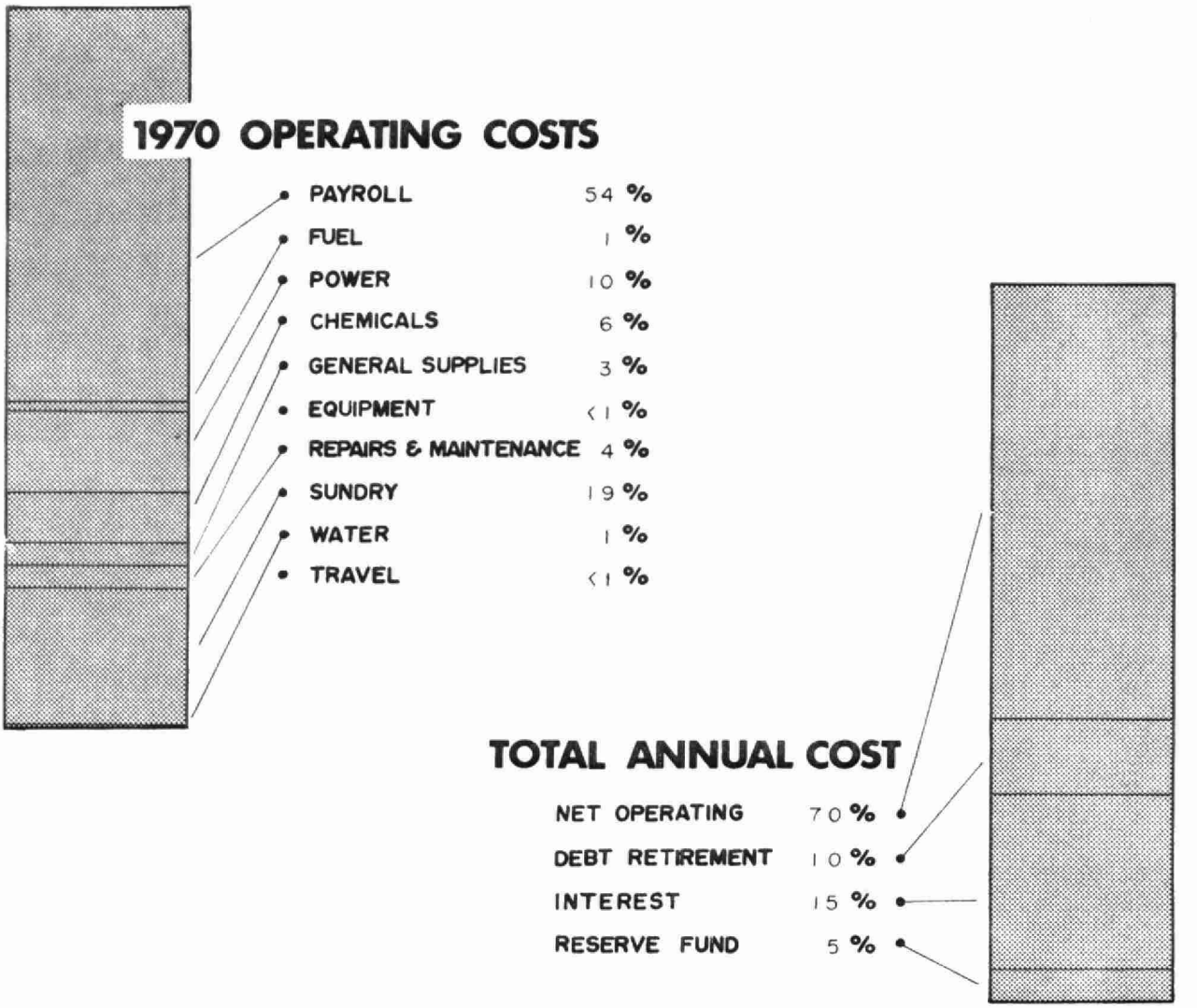
Scheduled expansion of the plant should begin as soon as possible in 1971.

PROJECT COSTS

NET CAPITAL COST (Final)	$1,211,259.48
DEDUCT - Portion financed by CMHC/MDLB (Final)	804,340.16
Long Term Debt to OWRC	$ 406,919.32
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	$ 137,994.55
Net Operating	$ 104,966.90
Debt Retirement	14,763.00
Reserve	7,160.64
Interest Charged	22,798.15
TOTAL	$ 149,688.69

RESERVE ACCOUNT

Balance @ January 1, 1970	$ 43,312.99
Deposited by Municipality	7,160.64
Interest Earned	2,953.50
	$ 53,427.13
Less Expenditures	1,758.10
Balance @ December 31, 1970	$ 51,669.03



Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	1903.9	$83,578.97	$43.90	3 cents
1967	2079.5	99,195.65	47.70	4 cents
1968	2147.4	87,458.45	40.73	3 cents
1969	2182.6*	94,613.16	43.35	3 cents
1970	1881.6	104,956.90	55.78	4 cents

* Total includes prorated flow for 31 days

MONTHLY OPERATING COSTS

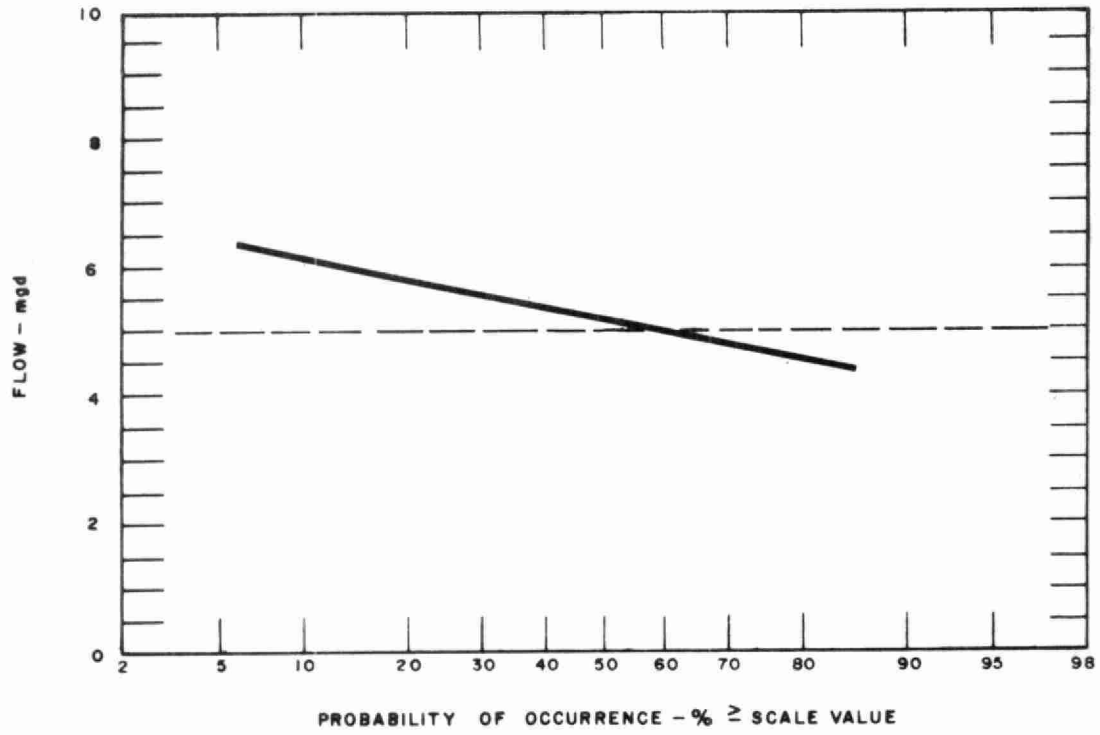
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	10500.99	6119.23	-	-	752.35	2034.50	161.17	-	-	1309.00	100.59	24.15
FEB	6515.31	4344.83	-	154.17	920.30	-	114.21	-	69.61	753.96	133.33	24.90
MAR	6442.75	4272.01	-	-	842.63	-	201.16	102.25	-	918.02	106.68	-
APR	8340.69	4272.47	-	-	769.74	-	226.51	342.26	1085.24	1370.65	99.68	174.15
MAY	7750.54	4726.11	-	136.05	795.07	-	194.80	9.43	459.05	1301.06	99.87	29.10
JUNE	8519.29	4278.89	448.71	-	881.23	-	17.82	(151.03)	146.97	2710.51	138.44	47.75
JULY	10572.16	4234.66	391.75	-	718.90	2440.20	581.17	-	731.81	1399.19	132.93	41.55
AUG	11637.53	6253.68	541.94	136.81	805.71	-	89.47	333.59	47.08	3346.10	83.15	-
SEPT	10229.09	4204.94	133.69	-	879.77	-	133.55	-	279.27	4437.11	117.16	45.60
OCT	8431.83	4136.10	-	-	849.32	-	483.49	-	776.15	1859.70	157.82	169.25
NOV	6028.96	4619.56	-	145.73	793.53	5.18	27.06	-	216.26	67.66	109.18	44.80
DEC	9987.76	4136.02	-	860.82	1406.38	2295.20	571.24	(208.00)	614.58	74.97	187.20	49.35
TOTAL	104956.90	55496.50	1516.09	1433.58	10414.92	6775.08	2801.65	428.50	4426.02	19547.93	1466.03	650.60

BRACKETS INDICATE CREDIT

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $17773.50

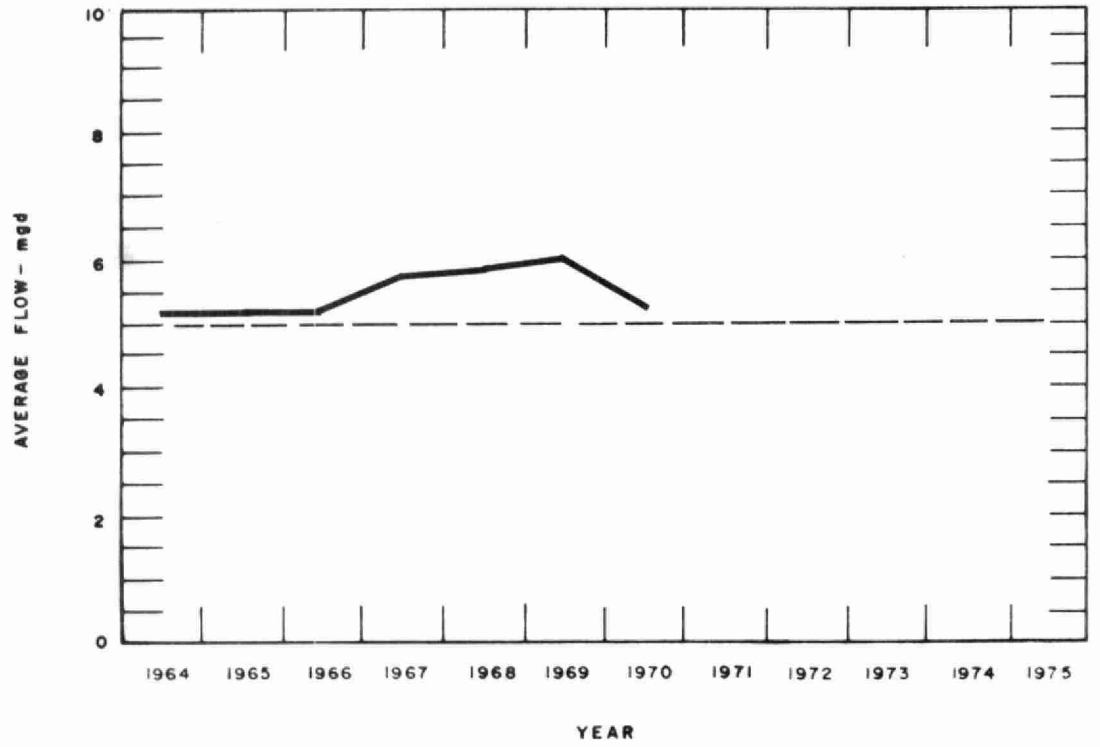
Note: Total does not include year-end adjustments.

PROCESS DATA



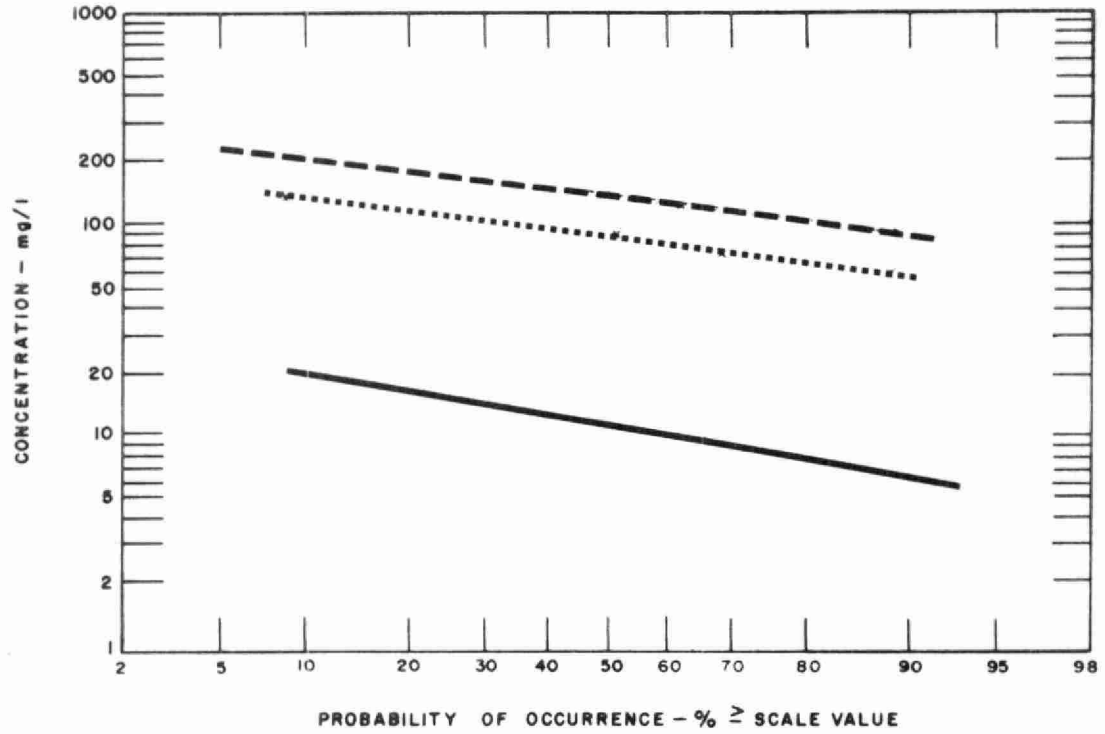
FLOWS

NOMINAL CAPACITY ——— ——— ———

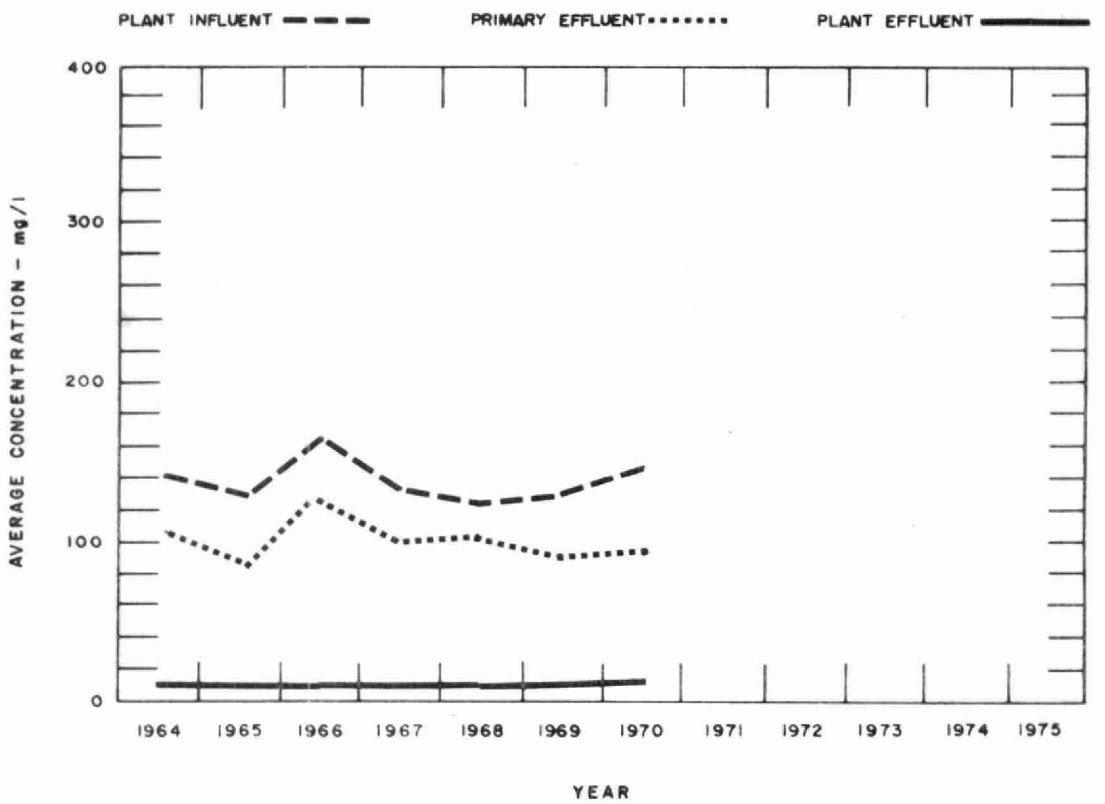


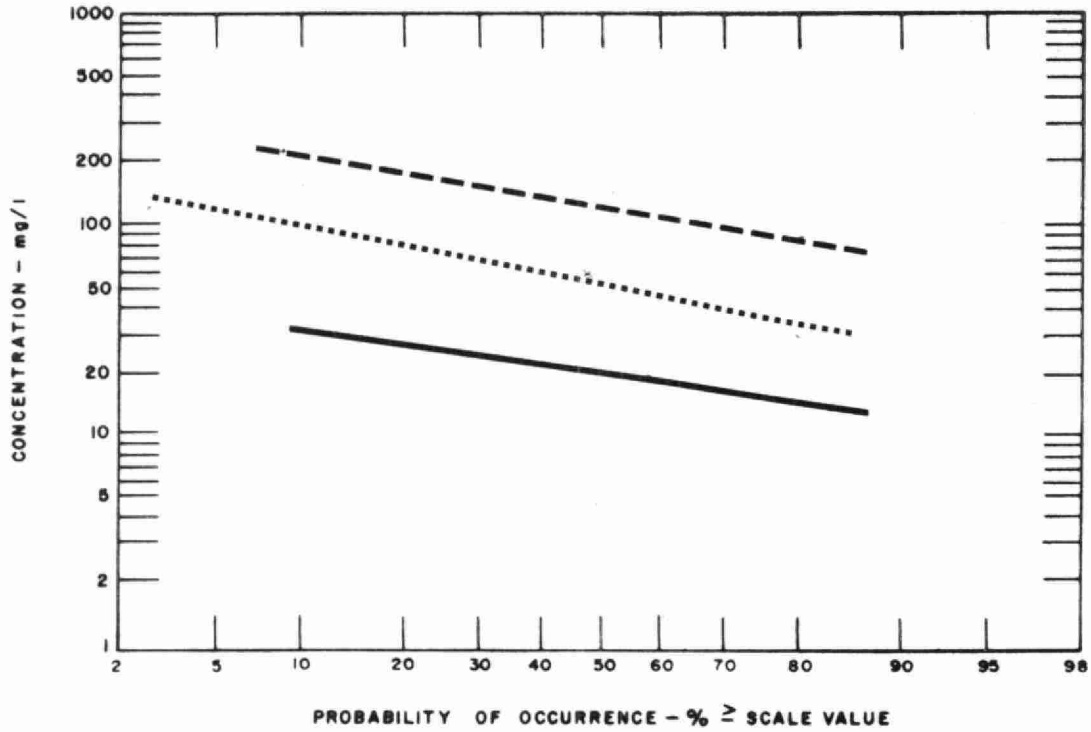
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10^3 pounds	DOSAGE mg/l
JAN	168.6	5.44	6.4	4.4	5.5	3.3
FEB	155.3	5.55	6.4	4.5	5.0	3.3
MAR	181.2	5.84	7.4	4.4	4.5	2.5
APR	168.4	5.61	7.1	4.4	4.6	2.7
MAY	161.0	5.20	5.9	4.1	4.6	2.9
JUNE	149.8	5.00	5.8	3.8	4.4	2.9
JULY	146.2	4.73	6.1	3.7	4.5	3.1
AUG	148.7	4.79	6.0	3.6	3.9	2.6
SEPT	146.9	4.91	6.4	2.9	4.4	3.0
OCT	151.6	4.88	5.6	3.5	5.4	3.3
NOV	149.2	4.98	5.7	3.7	4.9	3.3
DEC	154.7	4.98	6.0	3.7	4.4	2.9
TOTAL	1881.6	-	-	-	56.1	-
AVERAGE	-	5.16	7.4	2.9	-	3.0

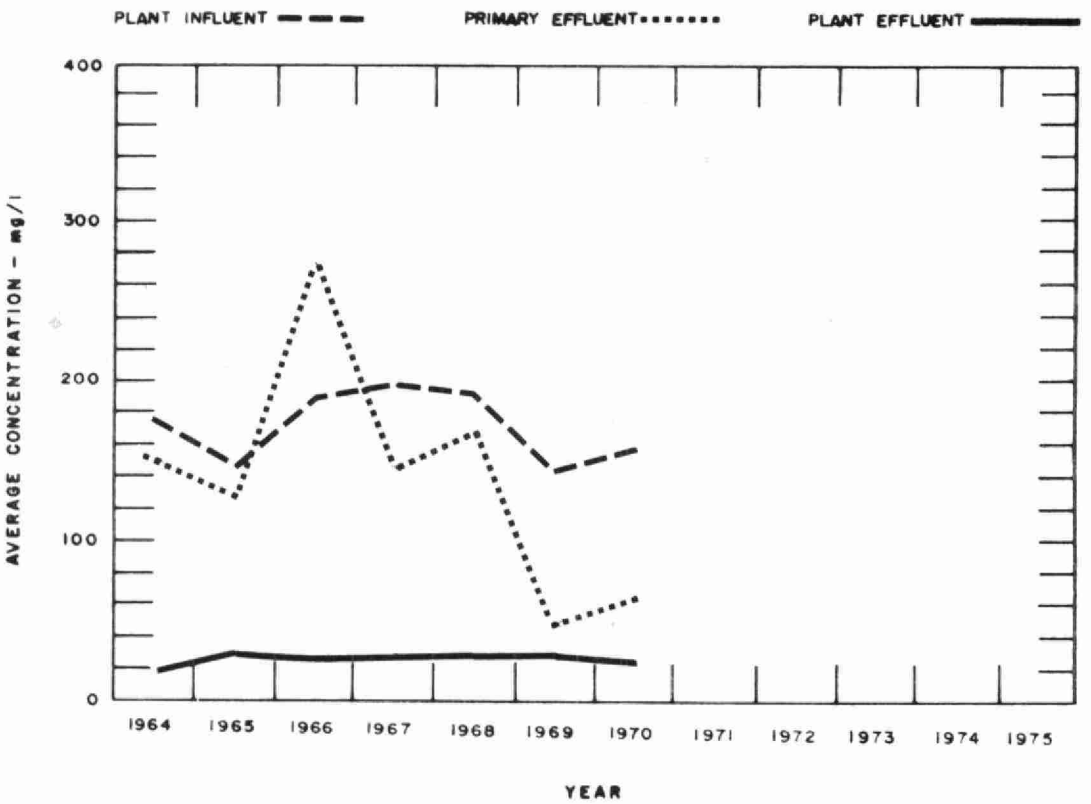


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



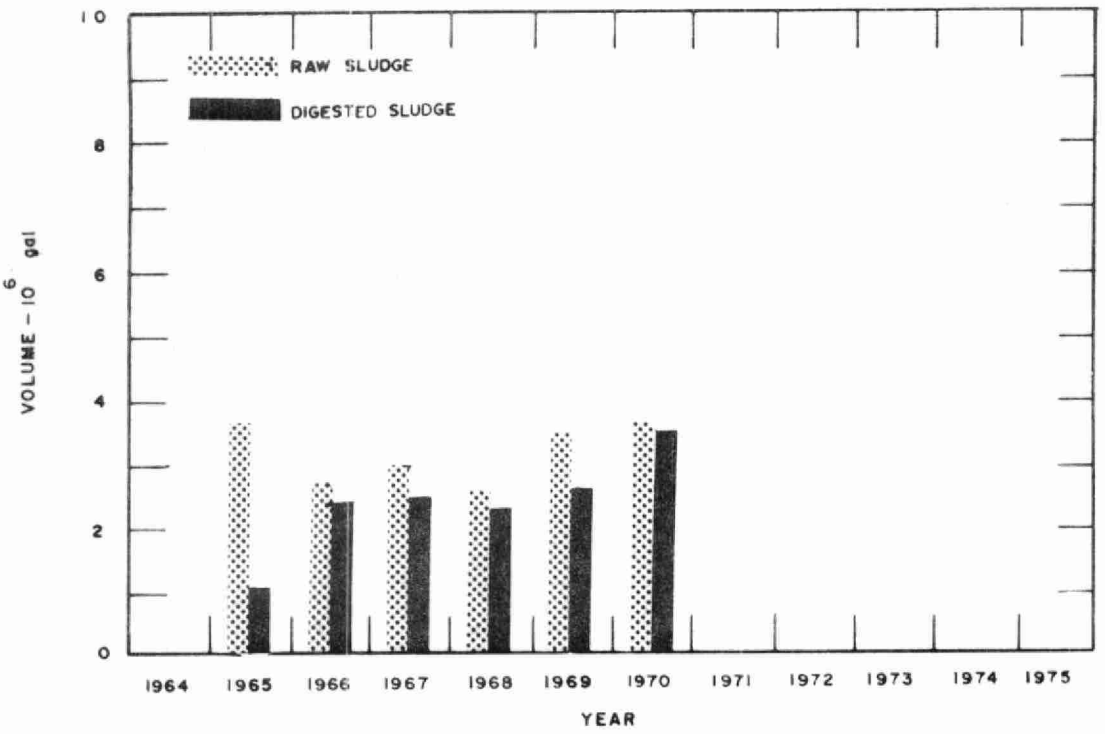
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10^5 pounds	n	mg/l	n	mg/l	%	10^5 pounds	cu ft
JAN	9	173	2	14	92	2.7	22	121	2	25	79	1.6	30
FEB	10	185	2	9	95	2.7	21	170	2	13	92	2.4	8
MAR	12	159	3	12	92	2.7	24	199	3	18	91	3.3	24
APR	11	100	2	13	87	1.5	24	142	2	23	84	2.0	57
MAY	10	174	2	9	94	2.6	22	348	2	18	95	5.3	27
JUNE	7	131	2	14	89	1.8	23	183	2	25	86	2.4	14
JULY	9	105	1	7	85	.6	20	96	1	25	74	1.0	28
AUG	8	118	1	5	96	1.7	22	112	1	15	87	1.4	13
SEPT	8	143	2	12	82	1,9	20	135	2	20	85	1.7	52
OCT	7	153	-	-	-	-	20	117	-	-	-	-	0
NOV	10	161	1	19	88	2.1	22	129	2	25	81	1.6	85
DEC	9	197	1	22	89	2.7	21	132	1	30	77	1.6	0
TOTAL	110	-	19	-	-	-	261	-	20	-	-	-	338
AVERAGE	9	151	2	12	92	2.1	22	158	2	21	87	2.2	28

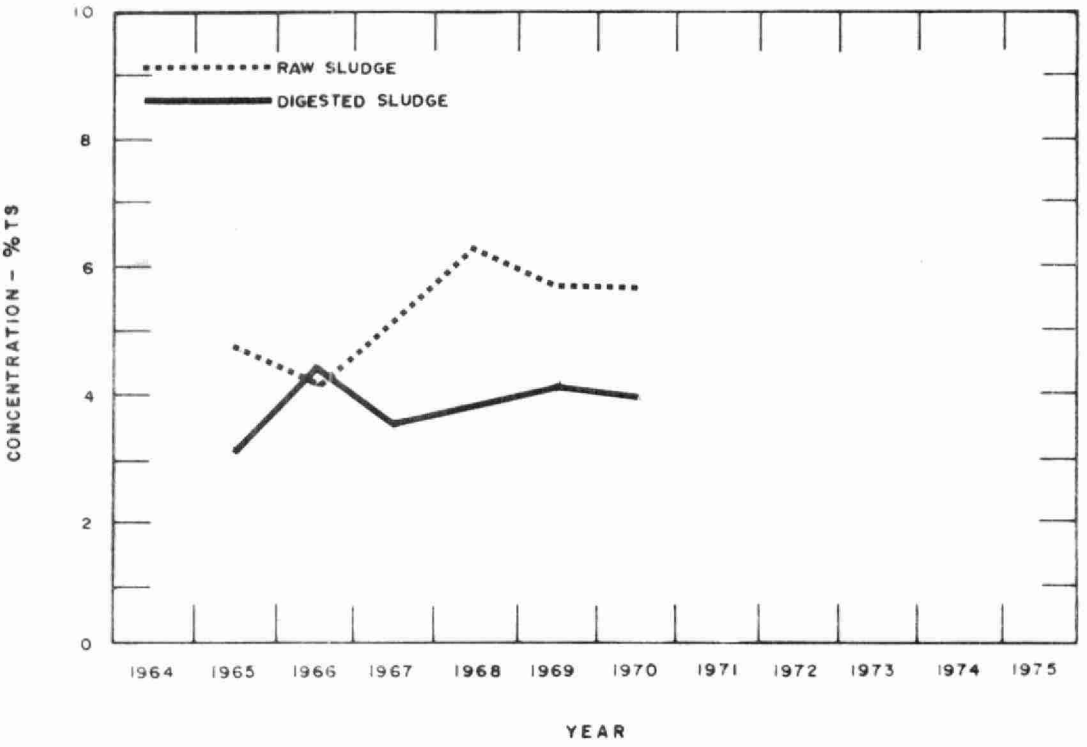
NOTE – n is the number of samples taken

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD / lb MLSS	AIR USED 1000 cu ft / lb BOD	WASTE SLUDGE 10^3 lb/day
		BOD mg/l	SS CONCN mg/l	BOD mg/l	SS CONCN mg/l				
JAN	5.4	123	73	18	21	3400	.13	-	8
FEB	5.6	105	75	8	15	3040	.13	-	9
MAR	5.8	79	68	9	17	3090	.10	-	12
APR	5.6	69	76	8	17	2970	.09	-	15
MAY	5.2	93	107	7	17	2870	.12	-	17
JUNE	5.0	84	57	8	21	2900	.10	-	14
JULY	4.7	62	27	5	11	2100	.09	-	13
AUG	4.7	81	35	10	13	2340	.11	-	8
SEPT	4.9	103	51	16	27	2800	.04	-	10
OCT	4.9	104	53	47	116	2490	.04	-	17
NOV	5.1	124	53	18	20	2270	.21	-	12
DEC	4.9	118	71	15	20	2480	.16	-	16
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	5.2	95	62	14	26	2730	.11	-	13


RAW SLUDGE
DIGESTED SLUDGE
VOLUME - 10^6 gal
0
2
4
6
8
10
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
CONCENTRATION - % TS
0
2
4
6
8
10
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	2.9	6.0	80	1.4	5.4	62	60	1.1	-	840
FEB	2.9	6.1	80	1.8	4.8	65	40	.5	-	1050
MAR	3.0	6.1	80	2.5	3.7	65	40	0	-	1512
APR	3.0	5.8	80	2.6	3.5	62	40	0	-	1503
MAY	3.0	7.2	76	5.1	3.1	65	0	0	-	3047
JUNE	3.0	6.8	80	1.9	3.6	67	0	0	-	1625
JULY	3.0	5.4	73	6.4	3.9	66	0	0	-	3831
AUG	3.0	5.9	71	6.3	-	-	0	0	-	3734
SEPT	5.5	-	-	3.4	-	-	0	0	-	2370
OCT	2.3	-	-	6.6	-	-	9	9	-	391
NOV	4.3	3.1	79	0	-	-	60	-	-	0
DEC	2.6	-	-	0	-	-	0	-	-	0
TOTAL	38.5	-	-	38.0	-	-	240	-	-	19903
AVERAGE	-	5.8	78	-	4.0	65	-	.8	-	-

Water management in Ontario